

124.

Gymnastics of the Brain

BY

GRANT, M.D., F.R.C.P. Lond.,

Consulting Physician General Hospital,

and to County of Carleton Pro-

testant Hospital, &c.

Ottawa.

*Before the Canada Med. Association
in Ottawa, September, 1880.*



Reprinted from *The Journal of Education*,
Toronto, August, 1880.



GYMNASTICS OF THE BRAIN.

BY J. A. GRANT, M.D., F.R.C.P., LOND., &c., OTTAWA.

GENTLEMEN,—In presenting this subject for the consideration of the Association, I feel satisfied that no more important topic could occupy the attention of medical science, than that which closely concerns the welfare of society, and promotes in the most comprehensive sense, the “*mens sana in corpore sano*.” Mental hygiene and physical hygiene are inseparably connected, and a few observations at present may not be out of place in regard to the essential balance of mind and body, and the application of a few ordinary principles to the present system of education. The physical well-being of the pupils in our schools should be as carefully guarded as the acquirement of knowledge. Year after year our educational system is becoming more complicated, and even the so-called common school course is quite academic in character, and more than an ordinary test of strength to the young brains, in their plastic state, budding forth to the supposed stage of practical usefulness. While acknowledging the rapid increase in the required subjects of study, branch after branch being yearly added, we must not overlook the very tree of life and the processes requiring such close attention to obviate the inroads of disease which soon sap vitality and ruin the prospects of the brightest specimens of intellect in the incipient stage of development. The mental and physical well-being of the pupils should advance equally, otherwise growth in either case, will become, in a measure, one-sided. While approaching the subject I am fully aware that

it is dangerous ground, still, as a matter of duty, it may not be out of place to advert briefly to a few points respecting which it is important all classes of the community should alike have full information. The point to which I first wish to direct attention is "the brain of youth." The problem, and one of the most difficult and trying of the age in which we live, is, how to build the best brains out of the materials placed at our disposal. Education or educated evolution certainly has considerable to do with the development of mental power. The building of a brain is a social problem of more than ordinary interest to every family circle. Mothers particularly have to do with it, and teachers are desirous of drawing out innate power in its various forms, just as varied and peculiar as the phases of the human countenance. The brain, the chief part of the nervous system, must be built up in keeping with the development of the whole body, the one depending greatly on the other in order to arrive at the greatest degree of power and perfection, either as to organization of structure, or performance of function. Dr. Maudsley, in his Gulstonian lectures for 1870, says :—"The time has come when the immediate business which lies before anyone who would advance our knowledge of mind, unquestionably is a clear and searching scrutiny of the bodily conditions, of its manifestations in health and disease ; he must recognize how entirely the integrity of the mental functions depends on the bodily organization, in fact, must acknowledge the unity of mind and body." The brain, the seat of the mind, possesses a mechanism peculiar in itself, and a power diversified in character, presenting various phases and peculiarities, throughout the highest order of intellectual development in the *genus homo*. In the crude and almost rudimentary state of cerebral pulp, soft, pliant and undecided in cerebral type, as to inherit mental power or capacity, more than ordinary care must be observed, in suddenly straining the structure, nature has put in the cranial cavity. The drawing out process, embraced in the true education must be conducted with care, caution, and more than ordinary guidance and observation. It is here that mental hygiene operates, embracing as it does all that relates to development, exercise and the maintenance of mental activity—in fact, education in the most comprehensive

sense. The brain may be considered a central telegraphic office, constantly distributing messages to every part of the system, and in order to attain success in the working of the complicated nervous machinery, it is absolutely necessary to know something of the physiological principles involved in the promotion of a single thought or idea. It is a well known fact that the growth, training and employment of the young, aid in the building up of a brain. On this basis Dr. Brown Sequard proposed the systematic training of the left hand in children, in order to develop the right side power of the brain equal to the left. In fact it is necessary, for the building of a powerful brain, that all the bodily organs should take their part. Brain labour or exercise in the work of the school, now termed cerebration, is the problem which to-day is occupying the attention of close observers, in the path of intellectual development. Taking into consideration the pliant character of young brain tissue in the very midst of the formative process of thought and ideality, the degree of exercise to the point of mental strain, must be guarded most carefully and patiently. As the normal performance of a function strengthens and develops the organ itself, so the brain becomes similarly influenced. Here student life comes in, with its advantages and disadvantages, and in order to attain the highest degree of intellectual development, reason, rather than cramming, is likely to bring about the desired object. While brain tissue is in the elementary stage, let elementary education be the pabulum of thought. As Huxley has remarked, "freshness and vigor of youth must be maintained in mind as well as body." The more closely we examine the subject of mental hygiene, the more closely it partakes of the common-sense principles how best to educate and train, to achieve the greatest degree of culture, embracing all the interests of man in his varied relations of life. To accomplish these desired results an important question arises: At what age should children be admitted to school? In the consideration of this point the peculiarities of brain structure require at least a passing notice. Fat, phosphorus and water are important factors in the elimination of brain power. In the infant the chief mass of the brain is soft and uniform, with smooth ventricles and a few convolutions. In the adult we find much better defined brain substance, with elaborate ventricles and

more numerous convolutions, less regular in character. In the infant, the peripheric nerves are larger in proportion than the nervous centres, excepting the sympathetic ganglia. The head of the new born, in fact is one-fourth the length of the body and one-fifth the weight, and all the parts of the body have their most rapid growth within the first three years of life. Between the fifth and sixth years the base of the brain grows rapidly. The interior of the brain at this age also gives evidence of rapid growth. The receptive faculties here obtain power and at this stage the foundation of education should be commenced slowly, gradually and cautiously, great care being bestowed to become acquainted with the innate peculiarities of the childish brain, while being stamped with the first thoughtful impressions. From all the information on this subject, the seventh year is considered as the period for the commencement of regular mental work, not however to strain the brain, but rather to bring about regular and gradual training of this intricate structure, having so many functions and taking so very important a part in the growth of the body. The brain is said to digest more than even the stomach in a sense, and certainly it governs largely the digestive process, and on that account how careful the teacher must be, in observing the growth and vigor of youth, so necessary in the formative process of thought, the bases of the common-sense principles of education. It is a well known fact that children sent to school too young, are more liable to the various diseases of childhood. Irregular temperature, defective muscular exercise and tight lacing, are powerful factors in the development of disease. Improper position, inclining to one side or the other while studying at the ordinary desk, frequently result in spinal deformity. How often it is the case that children failing in health, when subjected to a skilled examination, are found to have a high shoulder and 'curved spine, all of which have been permitted to pass unnoticed until advanced and seated as structural disease. During school life, the points for close examination are numerous, and too great care cannot be taken in guiding the tiny structures of those frames which afford such comfort in the home circle, and in time take their part in the intellectual development of national power and future greatness. To correct such difficulties and strengthen such sets of muscles as give evidence of failing

power, McLaren, of Oxford, has established a gymnasium, upon the entry of which a close and careful examination is made and a systematic method of training is adopted, sufficient to meet the growing requirements of the system. Glasgow University has also its gymnasium, and although not compulsory, its necessity is daily attracting closer enquiry. McGill College is also adopting the same principle. The gymnastics of brain or body should not conflict with each other, and in the growth and development of power the results to be achieved will certainly be greater than by cramming, under a system of hot house vegetation, through which both physical and intellectual vigor become warped, and practical usefulness for the varied spheres of life, considerably lessened. Hospital statistics point out that the principal mortality in children has passed between the seventh and eighth year, which strengthens the argument very considerably, as to the best time to enter school. Parents should not be anxious to convert schools into nurseries, and this point, I feel assured has not escaped the attention of those under whose immediate supervision the whole subject of school life is placed in our Dominion. To the ordinary observer, it must be apparent that the period between childhood and boyhood is one surrounded by constant anxiety and requiring more than ordinary care and watchfulness. For children under seven years of age the greater proportion of the teaching should be conducted or conveyed as play ; not as a play upon words, but a play in the development process of germinal intellectual power. It is in these years of childhood that education should not in any way conflict with health. Short hours of study, vigorous digestion, kept up by ample physical exercise, will assuredly bring about better results than the over-stimulation of young people, by competitive examinations, inducing a degree of mental high pressure, which may make bright pupils in childhood ; first in every class ; laden with prizes, but oftentimes sapped as to the requisite physical power for the varied callings of after-life. Those who require to live by muscular power chiefly, must develop the power early. In the cultivation of brain power, direction should as soon as possible be given to the practical usefulness of the future. Thus preserved, child power in time becomes good man power, and in the march of intellectual progress affords strength and endurance to the future of

our Dominion. In an address before the State Medical Society of New York, Doctor Agnew draws attention to the increasing prevalence of asthenopic, refractive and neurotic difficulties among scholars at the present day. These diseases he considers are growing rapidly in schools, colleges and other centres of civilization. In both England and Germany we have ample evidence of the same. The question arises, how are such diseases to be most judiciously guarded against? By careful scientific inspection and the rigid enforcement of personal and local sanitation. Defective school architecture has much to do with bringing about defects of vision through unequal expansion and contraction of the pupils. Hence the importance of the proper adjustment of light in the school-room. To correct such difficulties we are fortunate in having a city medical inspector, and the importance of such inspection cannot be over-estimated in carrying out efficiently the best working of our educational institutions. Doctor Cohan, of Breslau, examined the eyes of 10,000 school children and found that in various degrees there was a rapidly-increasing near-sightedness, and in some of the highest classes the near-sighted students were nearly sixty per cent. of the scholars. From these facts it is quite evident medical men have an important duty to perform outside the privilege of curing disease, if possible, once it has been developed. Thus we observe the absolute necessity of proper sanitary inspection, to stay the evils now on the increase, chiefly through an over-taxation of nerve tissue and nerve power, not in keeping with the physiological principles inculcated at the present day. From various sources, it is quite evident that within a few years lung diseases are on the increase in school children, and, in many instances, may be attributed to overcrowding and long and exhausting confinement in a vitiated atmosphere. The lofty ceilings of our new school houses are evidence of progress, but proper ventilation must be carried to such ceilings, otherwise they will become receptacles for foul air, to vitiate the entire atmosphere of the room. Fresh air is about the most important food of the system, and no where more than during school life, should there be a proper and well regulated supply. It is a well known fact that every individual poisons fifteen cubic feet of air every hour, in consequence of which thirty cubic feet should be supplied

every hour. If we desire to stay the progress of epidemic diseases, there should be every effort made to limit the number of pupils to the area of class-room accommodations. Well might Dr. Thomas, Rochester, remark at the Medical Society meeting in June, 1876, that "Education was not in all instances the unmistakable blessing which it seemed to be, for it became necessary to acquire it at too great a risk," and, under such circumstances, he recommended that every school district should have a competent and well paid medical director, who should devote himself thoroughly and conscientiously to the many hygienic duties of the position. It is impossible to over-estimate the importance of this subject which at present is engaging the attention of public men in every country. Dr. Bowditch in his address at the International Medical Congress, Philadelphia, 1876, stated that over 200,000 persons are annually slaughtered in the United States by preventable diseases. What the death rate in the school children in the Dominion may be, or in those of the Province of Ontario, now numbering 496,000, between the ages of five and sixteen years, I could not offer an estimate. From personal observation, I fear that the cramming system of the present day is not likely to produce a generation equal to the one now passing away. The most useless individuals in society are those who know everything and can do nothing. Our country is rapidly developing and we require workers; workers not converted into drones, by excessive ill-directed application in the buoyant period of youth. Let our education be directed towards the object in view, surrounded by the principles of common sense, and the outcome will be more lasting, the results more practical, and the rising generation, one quite able to grapple with the varied emergencies of certainly a trying age.

